TNA000249

TENNESSEE DEPARTMENT OF AGRICULTURE
Water Resources Program

November 22, 2010

RECEIVED
NOV 29 2010
Permit Section

Ms. Erin O'Brien
TDEC
L&C Annex, 6th Floor
Nashville, Tennessee 37243

Dear Ms. O'Brien:

I am writing to inform you that I have reviewed the application and Comprehensive Nutrient Management Plan (CNMP) for CAFO permit for Mr. Richard Bowling of Bedford County, Tennessee (previous NPDES Permit NO. TNA000249).

This letter is to confirm that the TDA has reviewed and approved the CNMP. I have enclosed a copy of the Nutrient Management Plan Requirements form, the original signed and dated revised, NOI form, and stamped Approval Stamp form for your review and final approval. I have also enclosed copies of corrections Ms. Lois Bowling made and incorporated into their CNMP including the most recent manure analysis and additional soil analyses which were missing from their original submitted application.

Sincerely,

Angela L. Warden
CAFO Specialist

: //enclosures

Ellington Agricultural Center
440 Hogan Road
Nashville, TN 37220
Telephone: 615-837-5492 Fax: 615-837-5025

TENNESSEE DEPARTMENT OF AGRICULTURE

Water Resources Program

The following individual has submitted all required elements of an NMP/CNMP as required to obtain a CAFO permit. Their Nutrient Management Plan (or CNMP) has been reviewed and approved by this office.

Name of Owner/Operator: Richard Bowling

Operation Name: Bowling Poultry

Address of Operation: 400 Coant Road Shelbyville, TN 37160

Phone Number: (931) 684-5170 County: Bedford

Date application was initiated:

RECEIVED
JUN 29 2010

Date approval forwarded to TDEC:

NOV 23 2010

NMP/CNMP Approval Date:

THE APPROVAL SHALL NOT BE CONSTRUED AS CREATING APRESUMPTION OF CORRECT
NOV 23 2010
OPERATION OR AS WARRANTING THAT THE APPROVED FACILITIES WILL REACH THE DESIGNED GOALS

Date approval received by TDEC

RECEIVED
NOV 29 2010
Permit Section

TDA Reviewer's Name: Angela Warden

TDA Reviewer's Signature: Angela L. Warden 11/23/10
Date

Tenn[illegible]e Department of Environment and Conser[illegible]on,
Division of Water Pollution Control
401 Church Street, 6th Floor L & C Annex, Nashville, TN 37243
(615) 532-0625

CONCENTRATED ANIMAL FEEDING OPERATION (CAFO) STATE OPERATING PERMIT (SOP) APPLICATION

Type of permit you are requesting: ☐ SOPCD0000 (designed to discharge) ☒ SOPC00000 (no discharge) ☐ Unknown, please advise

Application type: ☒ New Permit ☐ Permit Reissuance ☐ Permit Modification

If this NOI is submitted for Permit Modification or Reissuance provide the existing permit tracking number: TNA0005249

OPERATION IDENTIFICATION

Operation Name: **Bowling Poultry**		**County:**	**Bedford**
Operation Location/ Physical Address:	**400 Gant Road Shelbyville Tn 37160**	Latitude:	**35°27'34.01" N**
		Longitude:	**86°36'11.63" W**

Name and distance to nearest receiving water(s): **900 feet unamed tributary Sinking Creek**

If any other State or Federal Water/Wastewater Permits have been obtained for this site, list those permit numbers: **None**

Animal Type: ☒ Poultry ☐ Swine ☐ Dairy ☐ Beef ☐ Other _____

Number of Animals: 87000 | Number of Barns: 5 | Name of Integrator: Tyson Foods

Type of Animal Waste Management: (check all that apply)
☒ Dry
☐ Liquid
☐ Liquid, Closed System (i.e. covered tank, under barn pit, etc.)

Attach the NMP ☒ NMP Attached | Attach the closure plan ☒ Closure Plan Attached | Attach a topographic map ☒ Map Attached

PERMITTEE IDENTIFICATION

Official Contact (applicant): **Richard Bowling**	Title or Position: **Owner**			
Mailing Address: **336 Henderson Rd**	City: Shelbyville	State: **Tn**	Zip: **37160**	☒ Correspondence ☒ Invoice
Phone number(s): **(931)684-5170**	E-mail:			
Optional Contact:	Title or Position:			
Address:	City:	State:	Zip:	☐ Correspondence ☐ Invoice
Phone number(s):	E-mail:			

APPLICATION CERTIFICATION AND SIGNATURE (must be signed in accordance with the requirements of Rule 1200-4-5-.05)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name and title; print or type	Signature	Date
Richard Bowling	Richard Bowling	6-28-2010

STATE USE ONLY

Received Date	Reviewer	EFO	T & E Aquatic Fauna	Tracking No.

RECEIVED
JUN 29 2010

	Impaired Receiving Stream	High Quality Water	NOC Date

Richard Barling Shelbyville, TN Bedford

#202

Nutrient Management Plar Requirements

The following 9 items need to be submitted at the time the permit is applied for. Additional record-keeping items as outlined in the CAFO rules are also considered part of the nutrient management plan and must be kept on-site. More information on each item can be found in the CAFO rule (1200-4-5-.14).

☑ 1. **Two maps: (1.)** A map of your farm showing location of any animal barns/houses, compost bins, litter storage bins, manure lagoons/holding ponds, nearby roads, fields to which litter/manure will be applied, and non-application buffer areas around any bodies of water (streams, creeks, rivers, ponds, wells, sinkholes, springs, wetlands, etc.). A hand-drawn map is acceptable and even preferred. **(2.)** A topographic map of the farm (1:24000 scale, showing 1-mile radius from farm) showing property lines.

☑ 2. **Nutrient budget** – this is basically a balance sheet of all manure produced on the farm and all manure spread on the farm or removed from the farm. Application rates for all fields should be based on crop needs, realistic crop yield expectations, and actual manure analyses of nutrient content.

☑ 3. **Soil test results** for phosphorus and potassium for each application field. These must be taken at a minimum of every five years.

☑ 4. Results of **manure analysis** from within the past year. Annual manure testing is a requirement for all CAFOs. These results must be included with initial permit application if the farm is in operation. If the farm that is applying for the permit is new and not yet operating, then manure testing results need to be obtained once operation begins. At that point, the manure test results and revised application rates need to be submitted to TDA. Manure test results in subsequent years need to be kept as part of your record-keeping activities.

☑ 5. Results of the **Phosphorus Index** applied to each field that has a soil test P value of "High" or "Very High". In those situations, this tool will determine whether your application rates will be based on nitrogen or phosphorus.

☑ 6. Statement regarding method of **dead animal disposal**.

☑ 7. **Closure Plan** to be implemented in the event animal production ceases on the site.

These last two items are only required for medium-size CAFOs that manage **liquid manure**.

☐ 8. Documentation of **design of liquid waste handling system**. This should include, but is not limited to: volume for solids accumulation, design treatment volume, total design volume, the approximate number of days of storage capacity, pumping and routing of wastes, and any solid separation process. Ideally, this documentation would consist of the pertinent engineering drawings with accompanying descriptive narrative.

☐ 9. The construction, modification, repair, or installation of any portion of a CAFO liquid waste handling system (such as earthen holding pond, treatment lagoon, pit, sump or other earthen storage/containment structure) after April 13, 2006 must be preceded by a thorough **subsurface investigation**. This investigation will include a detailed soils investigation with special attention to the water table depth and seepage potential.

In addition to the items above, the following form(s) must accompany your application:

☑ ***Notice of Intent* form** must be submitted with all applications from Class II (Medium) CAFOs

OR

☐ **EPA Forms 1 and 2B** must be submitted with all applications from Class I (Large) CAFOs.

☑ **Addendum to Nutrient Management Plan**.

November 18, 2010

Richard Bowling
Bowling Poultry
336 Henderson Road
Shelbyville, TN 37160

Angela Warden
Ellington Agricultural Center
P. O. Box 40627
Nashville, TN 37204

Dear Ms Warden:

The following is a reply to your letter dated November 12, 2010.

Item: 1). We have a total of 5 broiler houses, three 300 X 42 feet and two 400 X 42. Enclosed are pages 8 & 10 with these corrections.

Item: 2 The number of flocks per year is 6. I have enclosed pages 16,17-18.

Item: 3 Enclosed is a copy of the manure analysis dated July, 2010.

Item: 4 Per our conversion yesterday. I have average out the fields that had more than one sample. A copy of page 36 with correction is enclosed. Field 5 the Ca should be 4,128, Field 7 The CEC should be 17.9 and in Field 8 the Soil should be 6.7.

Item: 5 Enclosed are copies of Soil analysis for Field 1, Field 5, Field 6, and Field 7.

Item: 6 Has been put on hold for now, per conversion with you yesterday.

Item: 7 We apply the litter in March or April, depending of the weather, rain fall, and ~~weather~~ whether the soil is dry enough.

Thank you for working with my sister, it has helped allot. Please let us know if there is anything else that we need to do. Thanks again for the help.

Sincerely Richard Bowling

Richard Bowling
Bowling Poultry

1.1. General Description of Operation

three R.B.

The Richard Bowling poultry operation consists of ~~two~~ 300 x 42 foot layer houses that contain 15,000 birds each and two 400 x 42 foot broiler houses that contain 21,000 birds each. This operation is located in Bedford County Tennessee. The land base is rolling to flat and consists of pasture and hayland. As much litter as possible will be used on the farm as nutrients for the pasture and hayland. All additional litter will be exported to an external operation.

All crustings will be stored in the stacking shed until they can be land applied or exported. At cleanout, all litter will be land applied or exported. If the cleanout litter cannot be immediately exported, it will be placed in the stacking shed. All litter is applied at maximum allowable (crop removal) rates. All spilled litter will be cleaned up and either placed in the stacking shed or land applied at the end of the between flock maintenance.

1.2. Sampling, Calibration and Other Statements

Manure Sampling Frequency
Manure samples will be taken in the fall prior to application.

Soil Testing Frequency
Soil test will be renewed in the every three years with a composite sample for each field and identified to match field identification used in this plan.

Equipment Calibration Method and Frequency
Application equipment will be calibrated with documentation annually.

Measures to Prevent Direct Contact of Animals with Water
Watering facilities are to be installed in all feeding areas as well as fencing to discourage animal contact with state waters.

Manure Applications
All manure will be surface applied in spring and fall at 1 year P rates.

Heavy use areas will be scraped when waste reaches 6- 8 inches or prior to any expected rainfall event.

Manure applications in this plan are based on MWPS 2004 data. Manure analysis will be required annually after implementation of this plan and will follow UT Ext. SOP for manure sampling.
Vegetation establishment is required around the buildings and storage structures to reduce soil erosion, this offsite nutrient and pathogen transport.

Critical Use Areas
All disturbed areas, including slopes of pads, will be planted to permanent vegetation. If construction is during seasons not suited for planting warm or cool season grasses, temporary vegetation will be established until the recommended planting dates. Refer to Application and Maintenance of Conservation Practices and specifically NRCS practice standard 342, Critical Area Treatment, for guidance.

All conservation practices and management activities planned and implemented as part of this CNMP should meet NRCS technical standards. For those elements, for which NRCS does not maintain technical standards, the criteria established by Land Grant Universities, industry, or other technically qualified entities will be met.

Veterinary Waste Management
All veterinary waste will be either disposed of through an approved land fill and sharps containers or by the attending veterinarian.

Revision Trigger
This nutrient management plan shall be reviewed when the results of soil tests are received to insure manure application rates are appropriate. This plan must be re-certified at least every five years. Updates of the CNMP will require re-certification whenever there are substantial changes made to the animal numbers or

Section 2. Manure and Wastewater Handling and Storage

This element addresses the components and activities, existing and planned, associated with the production facility, feedlot, manure and wastewater storage, treatment structures and areas, and any area used to facilitate transfer of manure and wastewater.

Description

three R.B.

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2.1. Map(s) of Production Area

Maps have fields numbered. They also show total acres in a field and the spreadable acres in each field. The top number is the field number, the middle number is the total acres in the field and the bottom number is the spreadable acres in the field.

7----------Field Number
26.38----------Total acres in the field
25.82----------Total application (spreadable) acres in the field

2.3. Manure Storage

Storage ID	Type of Storage	Pumpable or Spreadable Capacity	Annual Manure Collected	Maximum Days of Storage
House 1	In-house litter storage	680 Tons	105 Tons	2,364
House 2	In-house litter storage	680 Tons	105 Tons	2,364
House 3	In-house litter storage	680 Tons	105 Tons	2,364
House 4	In-house litter storage	907 Tons	147 Tons	2,252
House 5	In-house litter storage	907 Tons	147 Tons	2,252
Dry Stack	Poultry manure dry stack	594 Tons	0 Tons	

2.4. Animal Inventory

Animal Group	Type or Production Phase	Number of Animals	Average Weight (Lbs)	Confinement Period	Manure Collected (%)	Storage Where Manure Will Be Stored
House 1	Broiler	15,000	4	Jan Early - Dec Late	100	House 1
House 2	Broiler	15,000	4	Jan Early - Dec Late	100	House 2
House 3	Broiler	15,000	4	Jan Early - Dec Late	100	House 3
House 4	Broiler	21,000	4	Jan Early - Dec Late	100	House 4
House 5	Broiler	21,000	4	Jan Early - Dec Late	100	House 5

(1) Number of Animals is the average number of animals that are present in the production facility at any one time.
(2) If Manure Collected is less than 100%, this indicates that the animals spend a portion of the day outside of the production facility or that the production facility is unoccupied one or more times during the confinement period.

AGRICULTURAL DIAGNOSTIC LABORATORY

UNIVERSITY OF ARKANSAS - FAYETTEVILLE

***MANURE FOR FERTILIZER ANALYSIS (report for AGRI-429)

Name:	RICHARD BOWLING	Received in lab:	7/01/2010
Address:	336 HENDERSON RD.	Mailed:	7/09/2010
City:	SHELBYVILLE	State,Zip:	TN 37160
County:	BEDFORD (TN)	CK#:	9290

Lab. No.	M100926
Sample No.	1
Animal type	broilers
-age/lbs	none given
Bedding type	shavings/sawdust
Manure type	house
Sample date	6/28/2010
Age of manure	2 mo
pH	9.0
EC(umhos/cm)	9680
% H20	30.44
	-on dry basis-
Total %N	4.73
Total %P	1.16
Total %K	3.12
Total %Ca	2.11
Total %Carbon	45.63
NO3-N, mg/kg	
NH4-N, mg/kg	
	-on as-is basis-
Total %N	3.29
Total %P	0.81
Total %K	2.17
Total %Ca	1.47
Total %Carbon	31.74
NO3-N, mg/kg	
NH4-N, mg/kg	
	-lbs/ton on as-is basis-
N	65.8
P2O5	37.1
K2O	52.5
Ca	29.4
Total Carbon	634.8
NO3-N	
NH4-N	

***all analyses performed on "as-is" basis/ "dry" basis is calculated from moisture content

*lbs/ton P2O5 = %Total P on "as-is" basis multiplied by 20*2.29

*lbs/ton K2O = %Total K on "as-is" basis multiplied by 20*1.2

6.2. Manure Application Setback Distances

Setback Requirements: NRCS Standard

Feature	Setback Criteria	Setback Distance (Feet)
Well	Application upgradient of feature	300
Well	Application down-gradient of feature	150
Waterbody	Predominant slope <5% with good vegetation	30
Waterbody	Predominant slope >8%	100
Waterbody	Poor vegetation	100
Public road	All applications	50
Dwelling (other than producer)	All applications	300
Public use area	All applications	300
Property line	Application upgradient of feature	30

Source: Nutrient Management Standard 590
(http://efotg.nrcs.usda.gov/references/public/TN/Nutrient_Management_(590)_Standard.doc)

6.3. Soil Test Data

Field	Test Year	OM (%)	P Test Used	P	K	Mg	Ca	Units	Soil pH	Buffer pH	CEC (meq/100g)
1	2009	3.8	Mehlich-1	93	365	435	4,016	lbs/a	6.2	7.6	15.8
2	2009	2.8	Mehlich-1	76	366	390	3,020	lbs/a	5.9	7.6	13.2
3	2009	4.9	Mehlich-1	166	520	570	7,406	lbs/a	7.3	7.7	21.6
4	2009	2.9	Mehlich-1	110	278	380	3,146	lbs/a	6.3	7.6	12.9
5	2009	2.2	Mehlich-1	82	215	310	4,128	lbs/a	6.8	7.6	13.2
6	2009	2.0	Mehlich-1	50	162	334	4,950	lbs/a	6.8	7.6	16.8
7	2009	2.6	Mehlich-1	83	223	425	5,119	lbs/a	6.4	7.7	18.9
8	2009	2.0	Mehlich-1	110	164	379	5,647	lbs/a	6.7	7.7	18.2

6.4. Manure Nutrient Analysis

Manure Source	Dry Matter (%)	Total N	NH_4-N	Total P_2O_5	Total K_2O	Avail. P_2O_5	Avail. K_2O	Units	Analysis Source and Date
House 1		78.8	0.7	54.7	36.7	54.7	36.7	Lb/Ton	A&J Analytical Laboratories INC.
House 2		78.8	0.7	54.7	36.7	54.7	36.7	Lb/Ton	A&J Analytical Laboratories INC.
House 3		78.8	0.7	54.7	36.7	54.7	36.7	Lb/Ton	A&J Analytical Laboratories INC.
House 4		78.8	0.7	54.7	36.7	54.7	36.7	Lb/Ton	A&J Analytical Laboratories INC.
House 5		78.8	0.7	54.7	36.7	54.7	36.7	Lb/Ton	A&J Analytical Laboratories INC.
Dry Stack		78.8	0.7	54.7	36.7	54.7	36.7	Lb/Ton	A&J Analytical Laboratories INC.

(1) Entered analysis may be the average of several individual analyses.
(2) Tennessee assumes that 100% of manure phosphorus and 100% of manure potassium is crop available. First-year per-acre nitrogen availability for individual manure applications is given in the Planned Nutrient Applications table. For more information about nitrogen availability in Tennessee, see "Manure Application Management," Tables 3 and 4, Tennessee Extension, PB1510, 2/94 (http://wastemgmt.ag.utk.edu/ExtensionProjects/extension_publications.htm).

A&L Analytical Laboratories, Inc.

2790 Whitten Rd. Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440
www.allabs.com

SOIL ANALYSIS

Client	Grower	
Mr. John Donaldson 107 Donaldson Ave Celina TN 38551	RICHARD BOWLING	Report No: 09-187-0763 Cust No: 01560 Date Printed: 07/08/2009 Date Received: 07/06/2009 PO: Page: 1 of 15

Lab Number: 25137 **Field Id:** **Sample Id:** F1S1

Test	Results	SOIL TEST RATINGS (Very Low / Low / Medium / Optimum / High)
Soil pH	6.4	
Buffer pH	7.63	
Phosphorus (P)	128 LB/ACRE	
Potassium (K)	228 LB/ACRE	
Calcium (Ca)	4610 LB/ACRE	
Magnesium (Mg)	432 LB/ACRE	
Sulfur (S)		
Boron (B)		
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		
Organic Matter	4.4 % ENR 132	
Nitrate Nitrogen		

Calculated Cation Exchange Capacity

16.6 meq/100g

Calculated Cation Saturation

%K	1.8
%Ca	69.4
%Mg	10.8
%H	17.8

K : Mg Ratio

0.16 ☐

SOIL FERTILITY GUIDELINES

Crop : **Rec Units:**

(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe

Crop : **Rec Units:**

Comments

Patent Pending 1999

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SOIL ANALYSIS

Client	Grower	
Mr. John Donaldson 107 Donaldson Ave Celina TN 38551	RICHARD BOWLING	Report No 09-187-0763 Cust No 01560 Date Printed 07/08/2009 Date Received 07/06/2009 PO Page 2 of 15

Lab Number : 25138 **Field Id :** **Sample Id :** F1S2

Test	Results
Soil pH	6.1
Buffer pH	7.49
Phosphorus (P)	58 LB/ACRE
Potassium (K)	502 LB/ACRE
Calcium (Ca)	3422 LB/ACRE
Magnesium (Mg)	438 LB/ACRE
Sulfur (S)	
Boron (B)	
Copper (Cu)	
Iron (Fe)	
Manganese (Mn)	
Zinc (Zn)	
Sodium (Na)	
Soluble Salts	
Organic Matter	3.3 % ENR 110
Nitrate Nitrogen	

SOIL TEST RATINGS

Very Low | Low | Medium | Optimum | High

Calculated Cation Exchange Capacity

15.1 meq/100g

Calculated Cation Saturation

%K	4.3
%Ca	56.7
%Mg	12.1
%H	27.0

K : Mg Ratio

0.35

SOIL FERTILITY GUIDELINES

Crop : **Rec Units:**

(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe

Crop : **Rec Units:**

Comments

Patent Pending 1999

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SOIL ANALYSIS

Client	Grower	
Mr. John Donaldson 107 Donaldson Ave Celina TN 38551	RICHARD BOWLING	Report No: 09-187-0763 Cust No: 01560 Date Printed: 07/08/2009 Date Received: 07/06/2009 PO: Page: 6 of 15

Lab Number : 25142 **Field Id :** **Sample Id :** F5S1

Test	Results	SOIL TEST RATINGS (Very Low / Low / Medium / Optimum / High)
Soil pH	6.5	
Buffer pH	7.65	
Phosphorus (P)	140 LB/ACRE	
Potassium (K)	292 LB/ACRE	
Calcium (Ca)	3106 LB/ACRE	
Magnesium (Mg)	338 LB/ACRE	
Sulfur (S)		
Boron (B)		
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		
Organic Matter	2.0 % FNR 84	
Nitrate Nitrogen		

Calculated Cation Exchange Capacity

12.3 meq/100g

Calculated Cation Saturation

%K	3.0
%Ca	63.1
%Mg	11.4
%H	22.8

K : Mg Ratio

0.27

SOIL FERTILITY GUIDELINES

Crop : **Rec Units:**

(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe

Crop : **Rec Units:**

Comments :

Patent Pending 1999

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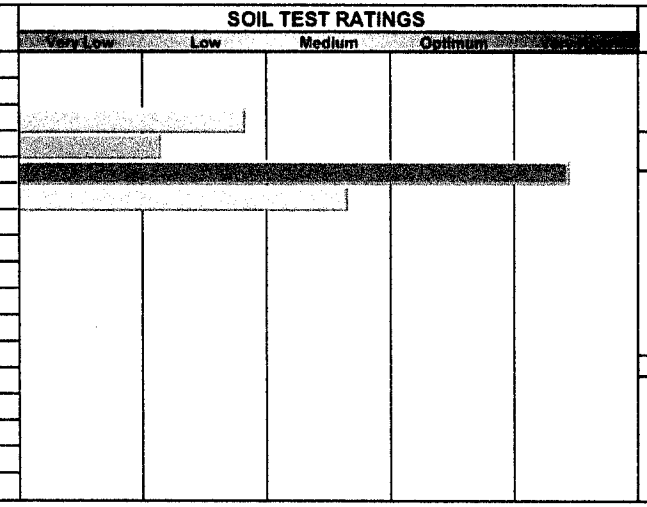
SOIL ANALYSIS

Client	Grower	
Mr. John Donaldson 107 Donaldson Ave Celina TN 38551	RICHARD BOWLING	Report No. 09-187-0763 Cust No. 01560 Date Printed 07/08/2009 Date Received 07/06/2009 PO. Page 7 of 15

Lab Number : 25143 **Field Id :** **Sample Id :** F5S2

Test	Results
Soil pH	7.2
Buffer pH	7 69
Phosphorus (P)	24 LB/ACRE
Potassium (K)	138 LB/ACRE
Calcium (Ca)	5150 LB/ACRE
Magnesium (Mg)	282 LB/ACRE
Sulfur (S)	
Boron (B)	
Copper (Cu)	
Iron (Fe)	
Manganese (Mn)	
Zinc (Zn)	
Sodium (Na)	
Soluble Salts	
Organic Matter	2.3 % ENR 90
Nitrate Nitrogen	



Calculated Cation Exchange Capacity

14.2 meq/100g

Calculated Cation Saturation

%K	1.2
%Ca	90.7
%Mg	8.3
%H	0.0

K : Mg Ratio

0.15 ☐

SOIL FERTILITY GUIDELINES

Crop : **Rec Units:**

(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe

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SOIL ANALYSIS

Client	Grower	
Mr. John Donaldson 107 Donaldson Ave Celina TN 38551	RICHARD BOWLING	Report No 09-187-0763 Cust No 01560 Date Printed 07/08/2009 Date Received 07/06/2009 PO: Page 9 of 15

Lab Number : 25146 **Field Id :** **Sample Id :** F7S1

Test	Results	SOIL TEST RATINGS (Very Low / Low / Medium / Optimum / High)
Soil pH	6.4	
Buffer pH	7.63	
Phosphorus (P)	122 LB/ACRE	
Potassium (K)	258 LB/ACRE	
Calcium (Ca)	3528 LB/ACRE	
Magnesium (Mg)	436 LB/ACRE	
Sulfur (S)		
Boron (B)		
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		
Organic Matter	2.0 % ENR 84	
Nitrate Nitrogen		

Calculated Cation Exchange Capacity

13.9 meq/100g

Calculated Cation Saturation

%K	2.4
%Ca	63.5
%Mg	13.1
%H	21.3

K : Mg Ratio

0.18 ☐

SOIL FERTILITY GUIDELINES

Crop : **Rec Units:**

(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe

Crop : **Rec Units:**

Comments :

Patent Pending 1999

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SOIL ANALYSIS

Client	Grower	
Mr. John Donaldson 107 Donaldson Ave Celina TN 38551	RICHARD BOWLING	Report No 09-187-0763 Cust No 01560 Date Printed 07/08/2009 Date Received 07/06/2009 PO Page 10 of 15

Lab Number : 25147 **Field Id :** **Sample Id :** F7S2

Test	Results	SOIL TEST RATINGS (Very Low / Low / Medium / Optimum / High)
Soil pH	6.0	
Buffer pH	7.59	
Phosphorus (P)	80 LB/ACRE	
Potassium (K)	204 LB/ACRE	
Calcium (Ca)	3496 LB/ACRE	
Magnesium (Mg)	380 LB/ACRE	
Sulfur (S)		
Boron (B)		
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		
Organic Matter	2.7 % ENR 98	
Nitrate Nitrogen		

Calculated Cation Exchange Capacity

13.9 meq/100g

Calculated Cation Saturation

%K	1.9
%Ca	62.9
%Mg	11.4
%H	23.6

K : Mg Ratio

0.17 ☐

SOIL FERTILITY GUIDELINES

Crop : **Rec Units:**

(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe

Crop : **Rec Units:**

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SOIL ANALYSIS

Client	Grower	
Mr. John Donaldson 107 Donaldson Ave Celina TN 38551	RICHARD BOWLING	Report No: 09-187-0763 Cust No: 01560 Date Printed: 07/08/2009 Date Received: 07/06/2009 PO: Page: 11 of 15

Lab Number : 25148 **Field Id :** **Sample Id :** F7S3

Test	Results
Soil pH	6.8
Buffer pH	7.64
Phosphorus (P)	46 LB/ACRE
Potassium (K)	206 LB/ACRE
Calcium (Ca)	8332 LB/ACRE
Magnesium (Mg)	460 LB/ACRE
Sulfur (S)	
Boron (B)	
Copper (Cu)	
Iron (Fe)	
Manganese (Mn)	
Zinc (Zn)	
Sodium (Na)	
Soluble Salts	
Organic Matter	3.0 % ENR 104
Nitrate Nitrogen	

SOIL TEST RATINGS

Very Low | Low | Medium | Optimum

Calculated Cation Exchange Capacity

25.9 meq/100g

Calculated Cation Saturation

%K	1.0
%Ca	80.4
%Mg	7.4
%H	11.1

K : Mg Ratio

0.14

SOIL FERTILITY GUIDELINES

Crop : **Rec Units:**

(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe

Crop : **Rec Units:**

Comments :

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SOIL ANALYSIS

Client	Grower	
Mr. John Donaldson 107 Donaldson Ave Celina TN 38551	RICHARD BOWLING	Report No: 09-187-0763 Cust No: 01560 Date Printed: 07/08/2009 Date Received: 07/06/2009 PO: Page: 12 of 15

Lab Number : 25149 **Field Id :** **Sample Id :** F8S1

Test	Results	SOIL TEST RATINGS (Very Low / Low / Medium / Optimum / High)
Soil pH	6.8	
Buffer pH	7.73	
Phosphorus (P)	196 LB/ACRE	
Potassium (K)	152 LB/ACRE	
Calcium (Ca)	4978 LB/ACRE	
Magnesium (Mg)	420 LB/ACRE	
Sulfur (S)		
Boron (B)		
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		
Organic Matter	2.0 % ENR 84	
Nitrate Nitrogen		

Calculated Cation Exchange Capacity

16.5 meq/100g

Calculated Cation Saturation

%K	1.2
%Ca	75.4
%Mg	10.6
%H	13.1

K : Mg Ratio

0.11

SOIL FERTILITY GUIDELINES

Crop : **Rec Units:**

(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe

Crop : **Rec Units:**

Comments:

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SOIL ANALYSIS

Client	Grower	
Mr. John Donaldson 107 Donaldson Ave Celina TN 38551	RICHARD BOWLING	Report No 09-187-0763 Cust No 01560 Date Printed 07/08/2009 Date Received 07/06/2009 PO: Page 13 of 15

Lab Number : 25150 **Field Id :** **Sample Id :** F8S2

Test	Results	SOIL TEST RATINGS (Very Low / Low / Medium / Optimum)
Soil pH	6.8	
Buffer pH	7.72	
Phosphorus (P)	106 LB/ACRE	
Potassium (K)	164 LB/ACRE	
Calcium (Ca)	6542 LB/ACRE	
Magnesium (Mg)	378 LB/ACRE	
Sulfur (S)		
Boron (B)		
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		
Organic Matter	2.0 % ENR 84	
Nitrate Nitrogen		

Calculated Cation Exchange Capacity

20.4 meq/100g

Calculated Cation Saturation

%K	1.0
%Ca	80.2
%Mg	7.7
%H	11.0

K : Mg Ratio

0.13 ☐

SOIL FERTILITY GUIDELINES

Crop : **Rec Units:**

(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe

Crop : **Rec Units:**

Comments

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SOIL ANALYSIS

Client	Grower		
Mr. John Donaldson 107 Donaldson Ave Celina TN 38551	RICHARD BOWLING	Report No Cust No Date Printed Date Received PO Page	09-187-0763 01560 07/08/2009 07/06/2009 14 of 15

Lab Number : 25151 **Field Id :** **Sample Id :** F8S3

Test	Results	SOIL TEST RATINGS (Very Low / Low / Medium / Optimum)
Soil pH	6.5	
Buffer pH	7 68	
Phosphorus (P)	28 LB/ACRE	
Potassium (K)	176 LB/ACRE	
Calcium (Ca)	5422 LB/ACRE	
Magnesium (Mg)	340 LB/ACRE	
Sulfur (S)		
Boron (B)		
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		
Organic Matter	1 7 % ENR 78	
Nitrate Nitrogen		

Calculated Cation Exchange Capacity

17.8 meq/100g

Calculated Cation Saturation

%K	1.3
%Ca	76.2
%Mg	8.0
%H	14.4

K : Mg Ratio

0.16 ☐

SOIL FERTILITY GUIDELINES

Crop : **Rec Units:**

(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe
Crop :								**Rec Units:**		

Comments :

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2.6. Planned Manure Exports off the Farm

Month-Year	Manure Source	Amount	Receiving Operation
Apr 2010	Dry Stack	430 Tons	External Location
Apr 2011	Dry Stack	399 Tons	External Location
Apr 2012	Dry Stack	450 Tons	External Location

2.7. Planned Manure Imports onto the Farm

Month-Year	Manure's Animal Type	Amount	Originating Operation

(None)

2.8. Planned Internal Transfers of Manure

Month-Year	Manure Source	Amount	Manure Destination
Jan 2010	House 1	2 Tons	Dry Stack
Jan 2010	House 2	2 Tons	Dry Stack
Jan 2010	House 3	2 Tons	Dry Stack
Jan 2010	House 4	3 Tons	Dry Stack
Jan 2010	House 5	3 Tons	Dry Stack
Mar 2010	House 1	2 Tons	Dry Stack
Mar 2010	House 2	2 Tons	Dry Stack
Mar 2010	House 3	2 Tons	Dry Stack
Mar 2010	House 4	3 Tons	Dry Stack
Mar 2010	House 5	3 Tons	Dry Stack
Apr 2010	House 2	24 Tons	Dry Stack
Apr 2010	House 3	92 Tons	Dry Stack
Apr 2010	House 4	127 Tons	Dry Stack
Apr 2010	House 5	127 Tons	Dry Stack
Jun 2010	House 1	2 Tons	Dry Stack
Jun 2010	House 2	2 Tons	Dry Stack
Jun 2010	House 3	2 Tons	Dry Stack
Jun 2010	House 4	3 Tons	Dry Stack
Jun 2010	House 5	3 Tons	Dry Stack
Aug 2010	House 1	2 Tons	Dry Stack
Aug 2010	House 2	2 Tons	Dry Stack
Aug 2010	House 3	2 Tons	Dry Stack
Aug 2010	House 4	3 Tons	Dry Stack
Aug 2010	House 5	3 Tons	Dry Stack
Oct 2010	House 1	2 Tons	Dry Stack
Oct 2010	House 2	2 Tons	Dry Stack
Oct 2010	House 3	2 Tons	Dry Stack
Oct 2010	House 4	3 Tons	Dry Stack
Oct 2010	House 5	3 Tons	Dry Stack
Jan 2011	House 1	2 Tons	Dry Stack

Month-Year	Manure Source	Amount	Manure Destination
Jan 2011	House 2	2 Tons	Dry Stack
Jan 2011	House 3	2 Tons	Dry Stack
Jan 2011	House 4	3 Tons	Dry Stack
Jan 2011	House 5	3 Tons	Dry Stack
Mar 2011	House 1	2 Tons	Dry Stack
Mar 2011	House 2	2 Tons	Dry Stack
Mar 2011	House 3	2 Tons	Dry Stack
Mar 2011	House 4	3 Tons	Dry Stack
Mar 2011	House 5	3 Tons	Dry Stack
Apr 2011	House 2	16 Tons	Dry Stack
Apr 2011	House 3	89 Tons	Dry Stack
Apr 2011	House 4	117 Tons	Dry Stack
Apr 2011	House 5	117 Tons	Dry Stack
Jun 2011	House 1	2 Tons	Dry Stack
Jun 2011	House 2	2 Tons	Dry Stack
Jun 2011	House 3	2 Tons	Dry Stack
Jun 2011	House 4	3 Tons	Dry Stack
Jun 2011	House 5	3 Tons	Dry Stack
Aug 2011	House 1	2 Tons	Dry Stack
Aug 2011	House 2	2 Tons	Dry Stack
Aug 2011	House 3	2 Tons	Dry Stack
Aug 2011	House 4	3 Tons	Dry Stack
Aug 2011	House 5	3 Tons	Dry Stack
Oct 2011	House 1	2 Tons	Dry Stack
Oct 2011	House 2	2 Tons	Dry Stack
Oct 2011	House 3	2 Tons	Dry Stack
Oct 2011	House 4	3 Tons	Dry Stack
Oct 2011	House 5	3 Tons	Dry Stack
Jan 2012	House 1	2 Tons	Dry Stack
Jan 2012	House 2	2 Tons	Dry Stack
Jan 2012	House 3	2 Tons	Dry Stack
Jan 2012	House 4	3 Tons	Dry Stack
Jan 2012	House 5	3 Tons	Dry Stack
Mar 2012	House 1	2 Tons	Dry Stack
Mar 2012	House 2	2 Tons	Dry Stack
Mar 2012	House 3	2 Tons	Dry Stack
Mar 2012	House 4	3 Tons	Dry Stack
Mar 2012	House 5	3 Tons	Dry Stack
Apr 2012	House 2	34 Tons	Dry Stack
Apr 2012	House 3	98 Tons	Dry Stack
Apr 2012	House 4	129 Tons	Dry Stack
Apr 2012	House 5	129 Tons	Dry Stack
Jun 2012	House 1	2 Tons	Dry Stack

Month-Year	Manure Source	Amount	Manure Destination
Jun 2012	House 2	2 Tons	Dry Stack
Jun 2012	House 3	2 Tons	Dry Stack
Jun 2012	House 4	3 Tons	Dry Stack
Jun 2012	House 5	3 Tons	Dry Stack
Aug 2012	House 1	2 Tons	Dry Stack
Aug 2012	House 2	2 Tons	Dry Stack
Aug 2012	House 3	2 Tons	Dry Stack
Aug 2012	House 4	3 Tons	Dry Stack
Aug 2012	House 5	3 Tons	Dry Stack
Oct 2012	House 1	2 Tons	Dry Stack
Oct 2012	House 2	2 Tons	Dry Stack
Oct 2012	House 3	2 Tons	Dry Stack
Oct 2012	House 4	3 Tons	Dry Stack
Oct 2012	House 5	3 Tons	Dry Stack

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SOIL ANALYSIS

Client	Grower	
Mr. John Donaldson 107 Donaldson Ave Celina TN 38551	RICHARD BOWLING	Report No: 09-187-0763 Cust No: 01560 Date Printed: 07/08/2009 Date Received: 07/06/2009 PO: Page: 1 of 15

Lab Number : 25137 **Field Id :** **Sample Id :** F1S1

Test	Results	SOIL TEST RATINGS (Very Low / Low / Medium / Optimum / High)
Soil pH	6.4	
Buffer pH	7.63	
Phosphorus (P)	128 LB/ACRE	
Potassium (K)	228 LB/ACRE	
Calcium (Ca)	4610 LB/ACRE	
Magnesium (Mg)	432 LB/ACRE	
Sulfur (S)		
Boron (B)		
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		
Organic Matter	4.4 % ENR 132	
Nitrate Nitrogen		

Calculated Cation Exchange Capacity

16.6 meq/100g

Calculated Cation Saturation

%K	1.8
%Ca	69.4
%Mg	10.8
%H	17.8

K : Mg Ratio

0.16 ☐

SOIL FERTILITY GUIDELINES

Crop : **Rec Units:**

(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe

Crop : **Rec Units:**

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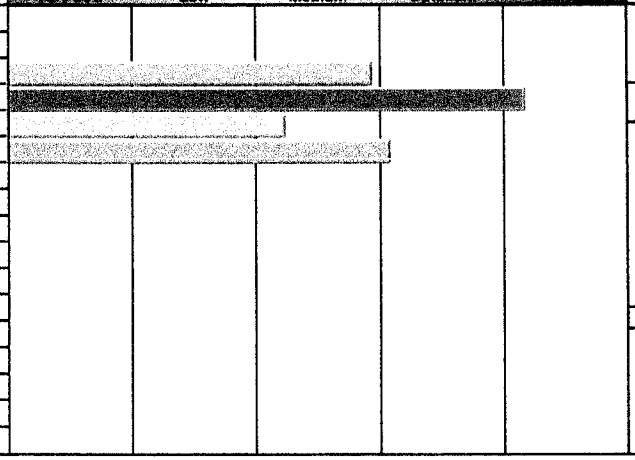
SOIL ANALYSIS

Client	Grower	
Mr. John Donaldson 107 Donaldson Ave Celina TN 38551	RICHARD BOWLING	Report No. 09-187-0763 Cust No: 01560 Date Printed. 07/08/2009 Date Received. 07/06/2009 PO. Page. 2 of 15

Lab Number : 25138 **Field Id :** **Sample Id :** F1S2

Test	Results	SOIL TEST RATINGS (Very Low / Low / Medium / Optimum)
Soil pH	6.1	
Buffer pH	7.49	
Phosphorus (P)	58 LB/ACRE	
Potassium (K)	502 LB/ACRE	
Calcium (Ca)	3422 LB/ACRE	
Magnesium (Mg)	438 LB/ACRE	
Sulfur (S)		
Boron (B)		
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		
Organic Matter	3.3 % ENR 110	
Nitrate Nitrogen		



Calculated Cation Exchange Capacity

15.1 meq/100g

Calculated Cation Saturation

%K	4.3
%Ca	56.7
%Mg	12.1
%H	27.0

K : Mg Ratio

0.35

SOIL FERTILITY GUIDELINES

Crop : **Rec Units:**

(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe
Crop :								**Rec Units:**		

Comments

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SOIL ANALYSIS

Client	Grower	
Mr. John Donaldson 107 Donaldson Ave Celina TN 38551	RICHARD BOWLING	Report No 09-187-0763 Cust No 01560 Date Printed 07/08/2009 Date Received 07/06/2009 PO: Page 6 of 15

Lab Number : 25142 **Field Id :** **Sample Id :** F5S1

Test	Results	SOIL TEST RATINGS (Very Low / Low / Medium / Optimum / High)
Soil pH	6.5	
Buffer pH	7.65	
Phosphorus (P)	140 LB/ACRE	
Potassium (K)	292 LB/ACRE	
Calcium (Ca)	3106 LB/ACRE	
Magnesium (Mg)	338 LB/ACRE	
Sulfur (S)		
Boron (B)		
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		
Organic Matter	2.0 % FNR 84	
Nitrate Nitrogen		

Calculated Cation Exchange Capacity

12.3 meq/100g

Calculated Cation Saturation

%K	3.0
%Ca	63.1
%Mg	11.4
%H	22.8

K : Mg Ratio

0.27

SOIL FERTILITY GUIDELINES

Crop : **Rec Units:**

(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe

Crop : **Rec Units:**

Comments :

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SOIL ANALYSIS

Client :
Mr. John Donaldson
107 Donaldson Ave
Celina TN 38551

Grower
RICHARD BOWLING

Report No: 09-187-0763
Cust No: 01560
Date Printed: 07/08/2009
Date Received : 07/06/2009
PO:
Page : 7 of 15

Lab Number : 25143 **Field Id :** **Sample Id :** F5S2

Test	Results	SOIL TEST RATINGS (Very Low / Low / Medium / Optimum / High)
Soil pH	7.2	
Buffer pH	7.69	
Phosphorus (P)	24 LB/ACRE	
Potassium (K)	138 LB/ACRE	
Calcium (Ca)	5150 LB/ACRE	
Magnesium (Mg)	282 LB/ACRE	
Sulfur (S)		
Boron (B)		
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		
Organic Matter	2.3 % ENR 90	
Nitrate Nitrogen		

Calculated Cation Exchange Capacity
14.2 meq/100g

Calculated Cation Saturation

%K	1.2
%Ca	90.7
%Mg	8.3
%H	0.0

K : Mg Ratio
0.15 ☐

SOIL FERTILITY GUIDELINES

Crop : **Rec Units:**

(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe

Crop : **Rec Units:**

Comments :

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SOIL ANALYSIS

Client	Grower	
Mr. John Donaldson 107 Donaldson Ave Celina TN 38551	RICHARD BOWLING	Report No 09-187-0763 Cust No 01560 Date Printed 07/08/2009 Date Received 07/06/2009 PO: Page 8 of 15

Lab Number : 25145 **Field Id :** **Sample Id :** F6S1

Test	Results	SOIL TEST RATINGS (Very Low / Low / Medium / Optimum / Very High)
Soil pH	6.8	
Buffer pH	7 65	
Phosphorus (P)	50 LB/ACRE	
Potassium (K)	162 LB/ACRE	
Calcium (Ca)	4950 LB/ACRE	
Magnesium (Mg)	334 LB/ACRE	
Sulfur (S)		
Boron (B)		
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		
Organic Matter	2.0 % ENR 84	
Nitrate Nitrogen		

Calculated Cation Exchange Capacity

16.8 meq/100g

Calculated Cation Saturation

%K	1.2
%Ca	73.7
%Mg	8.3
%H	16.7

K : Mg Ratio

0.15 ☐

SOIL FERTILITY GUIDELINES

Crop : **Rec Units:**

(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe

Crop : **Rec Units:**

Comments :

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SOIL ANALYSIS

Client	Grower	
Mr. John Donaldson 107 Donaldson Ave Celina TN 38551	RICHARD BOWLING	Report No 09-187-0763 Cust No: 01560 Date Printed 07/08/2009 Date Received 07/06/2009 PO: Page 9 of 15

Lab Number : 25146 **Field Id :** **Sample Id :** F7S1

Test	Results	SOIL TEST RATINGS (Very Low / Low / Medium / Optimum / ...)
Soil pH	6.4	
Buffer pH	7.63	
Phosphorus (P)	122 LB/ACRE	
Potassium (K)	258 LB/ACRE	
Calcium (Ca)	3528 LB/ACRE	
Magnesium (Mg)	436 LB/ACRE	
Sulfur (S)		
Boron (B)		
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		
Organic Matter	2.0 % ENR 84	
Nitrate Nitrogen		

Calculated Cation Exchange Capacity

13.9 meq/100g

Calculated Cation Saturation

%K	2.4
%Ca	63.5
%Mg	13.1
%H	21.3

K : Mg Ratio

0.18 ☐

SOIL FERTILITY GUIDELINES

Crop : **Rec Units:**

(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe

Crop : **Rec Units:**

Comments :

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SOIL ANALYSIS

Client :	Grower	
Mr. John Donaldson 107 Donaldson Ave Celina TN 38551	RICHARD BOWLING	Report No 09-187-0763 Cust No: 01560 Date Printed 07/08/2009 Date Received 07/06/2009 PO. Page . 10 of 15

Lab Number : 25147 **Field Id :** **Sample Id :** F7S2

Test	Results	SOIL TEST RATINGS (Very Low / Low / Medium / Optimum / Very High)
Soil pH	6.0	
Buffer pH	7.59	
Phosphorus (P)	80 LB/ACRE	
Potassium (K)	204 LB/ACRE	
Calcium (Ca)	3496 LB/ACRE	
Magnesium (Mg)	380 LB/ACRE	
Sulfur (S)		
Boron (B)		
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		
Organic Matter	2.7 % ENR 98	
Nitrate Nitrogen		

Calculated Cation Exchange Capacity

13.9 meq/100g

Calculated Cation Saturation

%K	1.9
%Ca	62.9
%Mg	11.4
%H	23.6

K : Mg Ratio

0.17 ☐

SOIL FERTILITY GUIDELINES

Crop : **Rec Units:**

(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe

Crop : **Rec Units:**

Comments :

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SOIL ANALYSIS

Client	Grower	
Mr. John Donaldson 107 Donaldson Ave Celina TN 38551	RICHARD BOWLING	Report No 09-187-0763 Cust No 01560 Date Printed 07/08/2009 Date Received 07/06/2009 PO: Page 11 of 15

Lab Number : 25148 **Field Id :** **Sample Id :** F7S3

Test	Results	SOIL TEST RATINGS (Very Low / Low / Medium / Optimum / High)
Soil pH	6.8	
Buffer pH	7.64	
Phosphorus (P)	46 LB/ACRE	
Potassium (K)	206 LB/ACRE	
Calcium (Ca)	8332 LB/ACRE	
Magnesium (Mg)	460 LB/ACRE	
Sulfur (S)		
Boron (B)		
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		
Organic Matter	3.0 % ENR 104	
Nitrate Nitrogen		

Calculated Cation Exchange Capacity	
25.9 meq/100g	
Calculated Cation Saturation	
%K	1.0
%Ca	80.4
%Mg	7.4
%H	11.1
K : Mg Ratio	
0.14	☐

SOIL FERTILITY GUIDELINES

Crop : **Rec Units:**

(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe

Crop : **Rec Units:**

Comments :

Patent Pending 1999